What is claimed is:

1. A device for steering a laser beam to a focal point in a medium, wherein the medium defines an orthogonal x-y-z coordinate system, said device comprising:

a laser source for directing the laser beam along a beam path toward the medium;

a first scanning mechanism positioned on the beam path for moving the laser beam in an x-direction in the medium;

a second scanning mechanism positioned on the beam path for compensating movement of the laser beam in the x-direction;

a third scanning mechanism positioned on the beam path for moving the laser beam in a y-direction in the medium;

a z-scanning apparatus for moving the focal point in a z-direction; and

a means for concertedly controlling movements of said first, said second and said third scanning mechanisms, and said z-scanning apparatus, for steering the laser beam toward the focal point in an x-y plane in the medium.

2. A device as recited in claim 1 wherein said first scanning mechanism, said second scanning mechanism, and said third scanning mechanism is a galvanometric mirror.

3. A device as recited in claim 1 wherein said z-scanning apparatus is an active mirror.

4. A device as recited in claim 1 wherein said z-scanning apparatus comprises:

a lens; and

a voice coil mounted on said device, wherein said lens is mounted on said voice coil for movement of the lens thereon back and forth along the beam path.

5. A device as recited in claim 1 further comprising a focusing lens positioned on the beam path, with said focusing lens defining a central axis.

6. A device as recited in claim 5 wherein the beam path is substantially centered on the central axis of said focusing lens when the laser beam is incident on said focusing lens.

7. A device as recited in claim 5 wherein said z-scanning apparatus, said first scanning mechanism, said second scanning mechanism, said third scanning mechanism, and said focusing lens are arranged sequentially, in order, along the beam path.

8. A device as recited in claim 1 wherein the medium is the cornea of an eye and further wherein the eye has an optical axis and the optical axis of the eye is substantially aligned in the z-direction.

9. A device as recited in claim 2 wherein said first galvanometric mirror is rotatable about a first axis of rotation, and wherein said first axis of rotation is substantially perpendicular to the beam path.

10. A device as recited in claim 9 wherein said second galvanometric mirror is rotatable about a second axis of rotation, and wherein said second axis is substantially perpendicular to the beam path and substantially parallel to the first axis of rotation of said first galvanometric mirror.

11. A device as recited in claim 10 wherein said third galvanometric mirror is rotatable about a third axis of rotation, and wherein the third axis is substantially perpendicular to the beam path and substantially perpendicular to the first and second axes of rotation of said respective first and said second galvanometric mirrors.

12. A device as recited in claim 11 wherein said first galvanometric mirror, said second galvanometric mirror and said third galvanometric mirror each have a respective center, and further wherein the center-to-center distance along the beam path between said first and second galvanometric mirrors is substantially the same as the center-to-center distance along the beam path between said second and third galvanometric mirrors.

13. A method for moving the focal point of a laser beam through a target tissue, which comprises the steps of:

directing the laser beam along a beam path to the center of a z-scanning apparatus wherein the z-scanning apparatus is moveable to change the location of the focal point in the target tissue in a z-direction;

passing the laser beam from the center of the z-scanning apparatus to the center of a first scanning mechanism, wherein the first scanning mechanism is rotatable to alter the beam path and introduce a change in the location of the focal point in the target tissue in an x-direction; and

rotating a second scanning mechanism to compensate for the altered beam path by redirecting the laser beam to the center of a third scanning mechanism, wherein the third scanning mechanism is rotatable to alter the beam path and introduce a change in the location of the focal point in the target tissue in a y-direction.

14. A method as recited in claim 13 wherein the laser beam transits a focusing lens positioned on the beam path, with said focusing lens defining a central axis, and further wherein the beam path is substantially centered on the central axis of said focusing lens when the laser beam is incident on said focusing lens.

15. A method for steering a laser beam to a focal point in a medium, wherein the medium defines an orthogonal x-y-z coordinate system, said method comprising the steps of:

activating a laser source to direct the laser beam along a beam path toward the medium;

directing the laser beam to a z-scanning apparatus for moving the focal point in a z-direction;

rotating a first galvanometric mirror about a first axis of rotation through an angle "θ";

rotating a second galvanometric mirror about a second axis of rotation through an angle of "2θ";

rotating a third galvanometric mirror about a third axis of rotation through an angle "ϕ"; and

concertedly controlling said z-scanning apparatus and the rotation of said first, said second and said third galvanometric mirrors for steering the laser beam toward the focal point in an x-y plane in the medium.

16. A method as recited in claim 15 wherein said z-scanning apparatus is an active mirror.

17. A method as recited in claim 15 wherein said z-scanning apparatus comprises:

a lens; and

a voice coil wherein said lens is mounted on said voice coil for movement of the lens thereon back and forth along the beam path.

18. A method as recited in claim 15 wherein said laser beam is a femtosecond laser beam having a wavelength of about one micron, a pulse duration in the range of 100-1000 femtoseconds, and a pulse energy in the range of 0.1 to 100 mJ.

19. A method as recited in claim 15 wherein the laser beam transits a focusing lens positioned on the beam path, with said focusing lens defining a central axis, and further wherein the beam path is substantially centered on the central axis of said focusing lens when the laser beam is incident on said focusing lens.

20. A method as recited in claim 15 wherein the medium is the cornea of an eye and further wherein the eye has an optical axis and the optical axis of the eye is substantially aligned along the z-axis of the x-y-z coordinate system.